



Installation and Maintenance Instructions for Commercial and Residential Use Gas-Fired Unit Heaters DGH 30 – 75

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

- Open windows.
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call your fire department.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliances.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or gas supplier.

CAUTION

To prevent premature heat exchanger failure do not located ANY gas-fired units in areas where chlorinated, halogenated, or acid vapors are present in the atmosphere.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm.

WARNING

All installation and service for this series of heaters **MUST** be performed by a qualified service agency or technician.

Please leave this manual with the owner.
Explain operation of the unit to the owner.

DO NOT RETURN EQUIPMENT TO THE RETAILER. CONTACT HAMILTON AT 1-800-879-0123.

PLEASE NOTE: This unit comes with a grounded plug requiring a dedicated electrical outlet with the proper polarity on its own circuit breaker. If the burners do not stay lit, verify the polarity of the outlet.

UNPACKING AND INSPECTION

1. Examine unit as received for any damages. If any damage is found, proper notation should be made on the carrier's freight bill. Claims should be made at once.
2. If any parts are missing, claims of shortage should be made to the manufacturer within five (5) days.
3. Check rating plate for correct type of gas and input.
4. Verify that the electrical rating shown on the rating plate will meet available power supply at the point of installation.

GENERAL

When consulting codes or standards referenced in this manual, consult the most recent edition of the code or standard.

Installation shall conform with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1 or the CAN/CGA B149 Installation Codes (latest editions).

This appliance is a gas-fired power vented unit heater with propeller-type fan, designed for suspended mounting in commercial, industrial and residential buildings. The unit heater is completely assembled and wired. Only the usual mounting brackets, gas, electric and flue connections are needed to put heater into operation. The unit heater is certified by the Canadian Standard Association in accordance with the American National Standard/Canadian Gas Association Standard for Gas Unit Heaters and Gas-Fired Duct Furnaces, ANSI Z83.8/CGA 2.6 and Z83.8a/CGA 2.6a for use with natural or LP gases and IAS U.S. Requirement No. 10-96 for Unit Heaters For Residential Use.

WARNINGS

Should over heating occur, or the gas supply fail to shutoff, shutoff the manual gas valve to the appliance before shutting off the electrical supply.

When replacing an existing heater, it may be necessary to re-size the venting system. Improperly sized venting system can result in vent gas leakage or condensation formation. Refer to the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B 149.1 or .2 latest edition. Failure to follow these instructions may result in serious injury or death.

This unit heater comes equipped with a power exhaust system. **Failure to follow these instructions may result in possible serious injury or even death.**

PRECAUTIONS

1. Read and keep these instructions for safe, efficient and trouble-free operation.
2. Do disconnect electrical power supply before making any wiring connections. Unit must be wired per the wiring diagram furnished with this heater.
3. Do turn off all gas before installing unit heater(s).
4. Do make sure that gas pressure never exceeds 14" w.c. (3.5 kPa).
5. Do check gas inlet supply pressure immediately upstream of combination control. The inlet supply pressure should measure 6-7" w.c. (1.5-1.7 kPa) for natural gas or 12-14" w.c. (3-3.5 kPa) on LP gas.
6. Do vent unit(s) to the outside.

7. Do maintain a rear clearance of 18" (45.7cm) or 6" (15.2cm) beyond motor at rear of unit, whichever is greater, and access side provide ample air for combustion and fan operation.
8. Do maintain minimum clearances from combustible material based on a 160°F (70°C) surface temperature.
9. Do consult piping, electrical and venting sections in this manual before finalizing installation.
10. Do keep all literature with this unit heater.
11. Do not install in potentially explosive or flammable atmosphere laden with rain dust, sawdust, or other air-borne materials.
12. Do not install heaters where there is high humidity or salt water atmospheres. This will cause corrosion resulting in reduction of the normal life of heater.
13. Do not locate in areas where there is a high concentration of chlorinated, halo-generated or acid vapors in the atmosphere, this will reduce heat exchangers life.
14. Do not install in tightly sealed rooms or small compartments (confined spaces) without provisions for adequate combustion air and venting.
15. Do not install heater outdoors.
16. Do not install heater closer to any combustible materials than what the heater was tested and listed.
17. Do not block air intake and discharge of the unit heater.

18. Do not attach duct work, air filters or plastic vent pipe to this unit heater.
19. Do not install below 7 ft. (2.1m) measured from bottom of heater to the floor in commercial applications and 5 ft. (1.5m) for residential applications.
20. Do not use this appliance if it has been under water. Immediately call a qualified service technician to inspect the appliance and replace any damaged equipment that has been under water.

LOCATION

In locating units, consideration should be given to the space heating requirements, availability of gas and proximity to vent location. The direction of the air stream should be pointed toward the area of greatest heat loss. Multiple units should be located so that the air streams set up a circulatory movement within the area being heated. Adjustable louvers are factory installed on front of the heater.

Do not install unit heater(s) in a confined space without providing wall openings to and from this space. Mounting height at which heaters are to be installed is critical. The critical height is from floor to the bottom of the unit(s) where heater will not deliver the required amount of heated air to the floor.

Unit heaters installed in Aircraft Hangers, Parking Structures and Repair Garages as applicable, must be installed in accordance with the Standard on Aircraft Hangers, ANSI/NFPA 409, the Standard for Parking Structures, ANSI/NFPA 88A and the Standard for Repair Garages, ANSI/NFPA 88B, and with the CAN1-B149 codes - latest editions.

WARNING: Gas-fired appliances are not designed for use in hazardous atmospheres containing chlorinated or halogenated hydrocarbons.

Figure 1A
Unit Heater Rear View

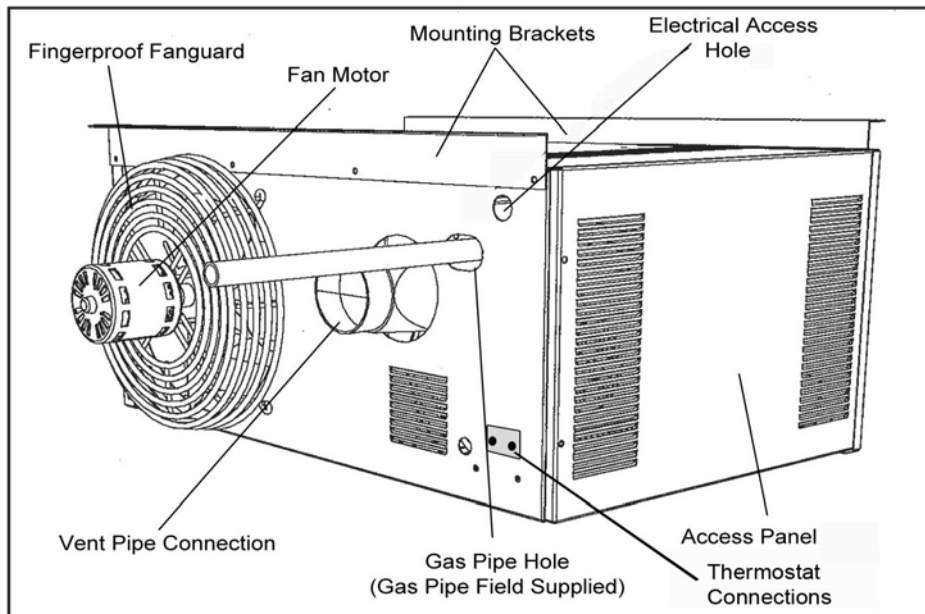


Figure 1B
Unit Heater in Standard Mounting Configuration
 (from factory this orientation - brackets not attached)

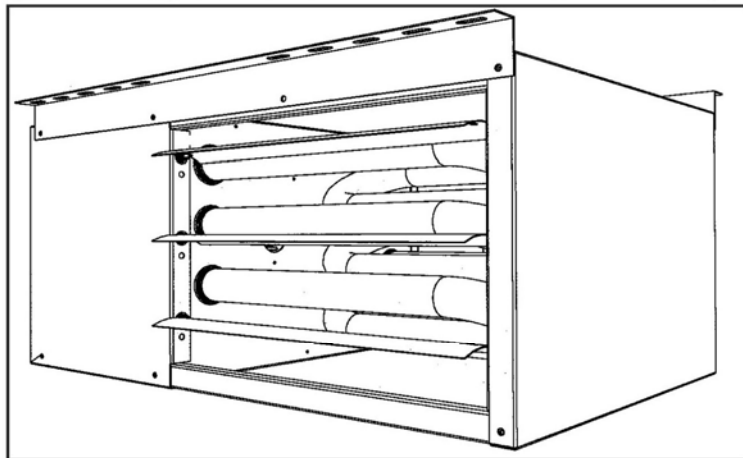
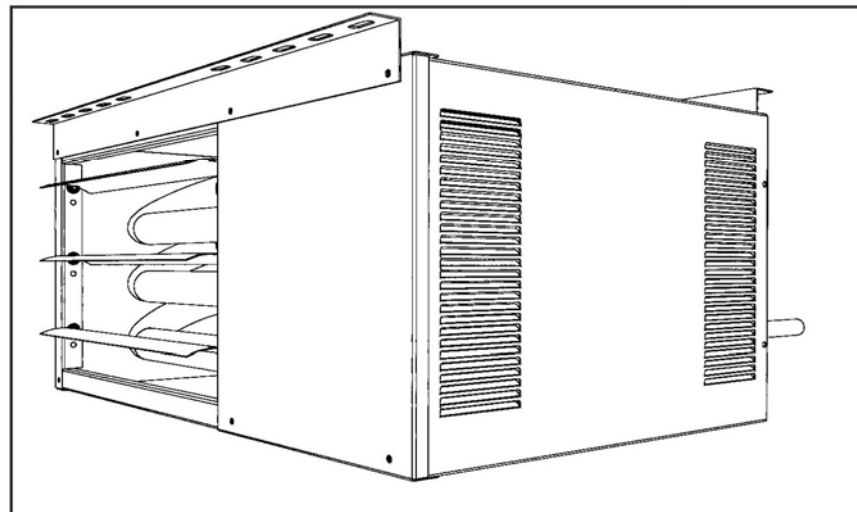


Figure 1C
Unit Heater Turned 180°
 (Access Panel and Heated Air Outlet Change Sides)



SUSPENSION

Unit(s) must be supported from the structural part of the building. Do not support from ceiling boards, roof panels or plaster ceiling.

Each unit is provided with two (2) angle brackets for mounting purposes. See Figure 1A on page 5 for typical suspension of the heater.

The heater must be installed in a level horizontal position so that the heater will operate properly. See Figures 1A and 1B on page 5.

Mounting brackets must be installed first before lifting heater. Decide if the unit is to be installed as received; that is with the controls on the left side when looking at the front of the appliance.

Remove and retain the (3) screws along the top edge of both the front and back of unit. Make sure the screws line up on the mounting brackets with the holes along the front and back top edges. Secure (1) mounting bracket to front of the appliance with the retained screw. Secure the other mounting bracket to the back side in the same way that the front one was done.

To suspend the heater, fasten the mounting brackets to the ceiling joist or truss, using 1/4" (.6cm) screws/lag bolts with 1/2" (1.3cm) washers. The mounting brackets are slotted to accommodate joists on 16 - 24 in. (4.9-7.3m) centers.

This heater may also be hung using same mounting brackets along with threaded rods. Attach threaded rod to the heater mounting brackets, fastening with a top and bottom nut.

Next, drill holes into a steel channel or angle iron at the same centerline dimensions chosen for the heater being installed. The steel channels or angle iron pieces must span and then be fastened to the appropriate structural members. Cut the rods to the desired length, push through holes that were made before and secure with

washers and lock nuts, lock washers and nuts, or a double nut arrangement similarly used on the unit heater mounting brackets.

This heater also can be installed on a shelf. The mounting brackets need to be attached as previously indicated. However, for shelf mounting the brackets will have to be secured to the bottom of the unit using 1/4" (.6cm) screws/lag bolts with 1/2" (1.3cm) washers as overhead joist or truss mounting. Be sure all clearances to combustible materials are met.

These unit heaters may also be turned 180 ° around from the way they were produced at the factory. Follow these steps for right side in.turned overin. installation (See Figure 1C on page 5).

1. Sides become opposite but the front and back remain in the same relative position.
Bottom panel now becomes the top and vice-versa.
2. Remove access panel and rotate 180 ° reattach it to the unit. This makes sure that all labels may be read.
3. Remove the louvers and springs. Turn them over so that the air is deflected opposite to what it was originally. Replace louvers springs. Adjust so that they are open and positioned to direct heated air to the floor.

COMBUSTION AIR

Adequate provisions of combustion air must be provided for this unit heater.

Since todayt.s buildings and homes are more tightly built so that less air infiltrates from the outside, it is very important that all heating equipment has adequate combustion air.

The requirements for combustion and ventilation air depends on how unit will be installed. That is either in confined or unconfined spaces. In both cases enough incoming air is required to eliminate negative pressure.

Confined or Unconfined Space

The National Fuel Gas Code defines an "unconfined space" as a space whose volume is greater than 50 cubic feet per 1000 Btu/Hr input of the installed appliance(s). A confined space is 50 cubic feet or less per 1000 Btu/Hr input of the installed appliance(s).

These unit heaters are not recommended for installation in residential confined spaces. This is due to the fact at some point in time these air openings may become blocked or eliminated by the owner. The National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149.1 or .2, the most current, must be strictly adhered to for providing adequate combustion air.

These unit heaters may be installed in confined spaces for commercial/industrial installation as long as these are two permanent openings located one at the top and one at the bottom. Each opening shall have a free area not less than one square inch (6.4cm²) per 1,000 Btu/Hr of total input rating of all units in the confined space and communicating with interior areas having adequate infiltration from the outside.

WARNING

Combustion air openings must, at all times, be kept free of obstructions. Any obstructions will cause improper burner operation and may result in a fire hazard or carbon monoxide injury.

VENTING

Venting installations shall be in accordance with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1 and applicable provisions of CAN/CGA B149 Installation Codes (latest editions), and any applicable provisions of local building codes.

This unit heater series is equipped with power exhaust system. Do not use any additional power exhaust systems or vent dampers. If any are used or failure to follow the instructions provided may result in serious injury or death.

A.) Use the following steps to ensure venting system is adequately sized:

1. Make sure that all unused openings have been sealed.
2. The venting system must be inspected for proper size and required horizontal pitch. Verify there is no blockage or restrictions, leakage, corrosion or other deficiencies that may lead to unsafe conditions.
3. Close all building doors, windows, doors leading between the space in which appliance(s) are located and other spaces of the building. Also turn on all exhaust fans so that they all operate at there maximum speeds. However, do not run summer exhaust fans and make sure all fireplace dampers are closed.
4. Start up unit heater(s) per the lighting instructions provided and adjust thermostat so that appliance will operate continuously.
5. With the unit in operation, check all draft hood equipped appliances after 5 minutes for any spillage by using either a burning match or candle.
6. Once each appliance, which has been connected to the venting system, properly vents when tested from the method outlined above, all doors, windows, exhaust fans, fireplace dampers and other gas-burning appliances may be returned to their earlier conditions of use.

7. If improper venting is observed during any of the above tests, the venting system must be corrected.
8. Should the venting system need to be revised, it must conform with the National Fuel Gas Code ANSI Z223.1 or CAN/CGA B149 Installation Codes-latest edition. Should the venting system need revising, it must approach minimum sizing as determined by the appropriate table Appendix "G" of the National Fuel Gas Code ANSI Z223.1.

Table 1
ANSI UNIT HEATER VENTING CRITERIA

Category	Description	Venting Criteria
I	Negative vent pressure Non-condensing	Follow standard venting criteria
II	Negative vent pressure Condensing	Condensate must be drained
III	Positive vent pressure Non-condensing	Vent must be gas tight
IV	Positive vent pressure Condensing	Vent must be liquid and gas tight. Condensate must be drained.

Note: A vent is the vertical passageway to convey flue gases from to the outside atmosphere. **Avent connector** pipe connects the units outlet to a vent or chimney.
Vent connectors serving a category I appliances shall not be connected into any portion of mechanical draft systems operating under positive pressure.

All vertically vented unit heaters are category I venting and all horizontally vented unit heaters are category III venting.

Use Table 1, determining the category requirements. Category III heaters, which are horizontally vented, shall conform to the venting requirements in Table 1 shown above along with detailed section on installing the vent pipe.

Unit heaters for vertical venting may be vented with either single wall or double wall vent pipe, and comply with the combustible clearances provided by the double wall manufacturers.

Unit heaters come with the vent adaptor already attached so that piping may be installed. Drill three holes so that pipe can be attached with 3 non-corrosive screws.

Vent pipe used shall be no smaller than 3 inches(7.6cm). Check National Fuel Gas Code for the minimum thickness allowed.

A.) Vertical Venting

1. Before venting vertically, a minimum of 12" (30.5cm) length of horizontal pipe is required from the exhaust outlet.
2. Install a tee fitting at the end of the horizontal run with a drip leg and cleanout cap as shown in Figure 2. Slope downward 1/4in. per foot (.6cm) towards the drip leg.
3. Avoid venting through unheated spaces. This could cause condensation problems. If vent pipe does pass through unheated space, insulate with insulation that is noncombustible and rate at 350 °F(175 °C), the first 5 ft. (1.5m) or 6 ft. (1.8m) of length.
4. Single wall vent pipe shall be at least 6" (15.2cm) from any combustible materials. Top clearances (top of heater) may be greater than specified if heat damage such as surrounding discoloration or material distortion is noticed.
5. If single wall vent does pass through combustible wall or floor a listed thimble shall be used. Should type B-0 double wall vent pass through combustible wall or floor maintain the vent pipe clearances as specified by the vent pipe manufacturer.
6. Do Not use any additional power exhaust systems or dampers on this unit heater. Failure To Follow These Instructions could result in serious injury or death.
7. These vertically vented unit heaters shall be connected to a factory built chimney or

vented into a masonry (or concrete) chimney lined with material acceptable with recognized standards and the authority having jurisdiction. Venting into an unlimited masonry chimney is not allowed. See the National Fuel Gas Code for common venting.

8. A minimum of 3 corrosion-resistant screws shall be used to secure vent joints. A listed vent cap must be utilized to stop drafts and moisture in the vent.
9. Reference the National Fuel Gas Code for the vertical distance on a pitched roof that the cap shall extend. See figure 2.

Figure 2 VERTICAL VENTING SLOPED ROOF

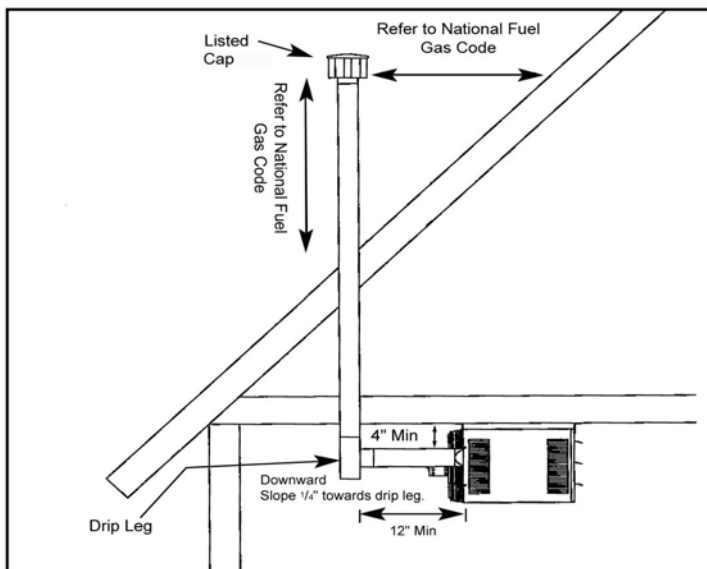


Figure 3A VERTICAL THROUGH COMBUSTIBLE FLOOR, ROOF

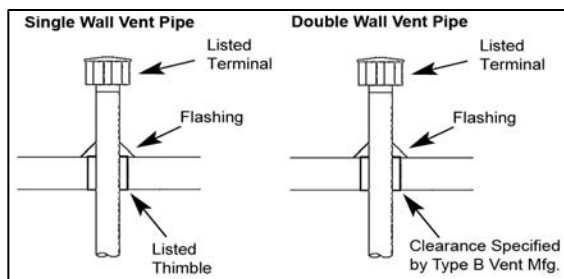
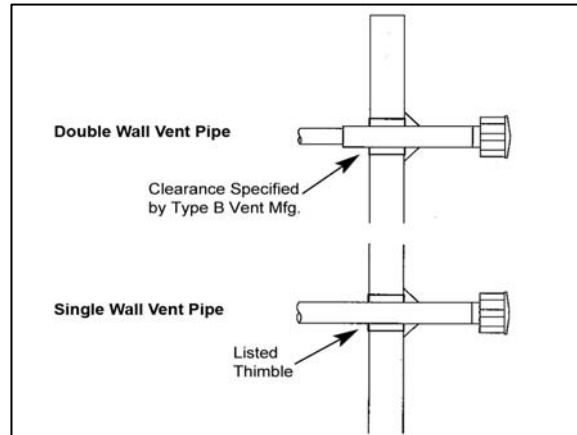


Figure 3B HORIZONTAL THROUGH COMBUSTIBLE WALL



B.) Instructions for Double Wall (Type B-0) Vent Pipe:

1. Attaching Single Wall Vent Cap to Double Wall Vent Pipe (Type B-0)
 - a.) Check for the "Flow" arrow on the vent pipe. Attach vent pipe to exhaust end of the double wall pipe.
 - b.) Slide the cap inside the pipe.
 - c.) Drill 3 holes through both the pipe and cap. Use 3/4in. (1.9cm) long sheet metal screws to secure cap to pipe.
2. Connecting Single Wall Vent Pipe to Double Wall (Type B-0) Vent Pipe:
 - a.) Slide single wall pipe into the inner wall of the double wall pipe.
 - b.) Drill 3 holes through both walls of the double wall pipe and through single wall pipe. Using 3/4" (1.9cm) long sheet metal screws attach the pipes. Do not over tighten.
 - c.) Seal the annular opening by running a large bead of 350°F (175°C) silicone. The "GAP" between single wall and double wall pipe shall be sealed. It is not necessary to fill the full volume of the annular area

Figure 4 Horizontal Venting With Upward Pitch

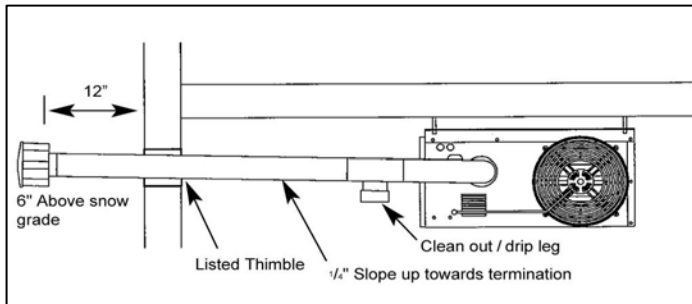


Figure 5 Downward Pitch with Drip Leg

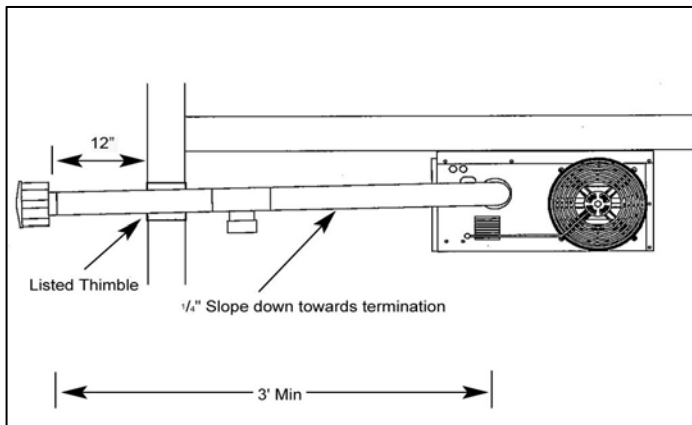
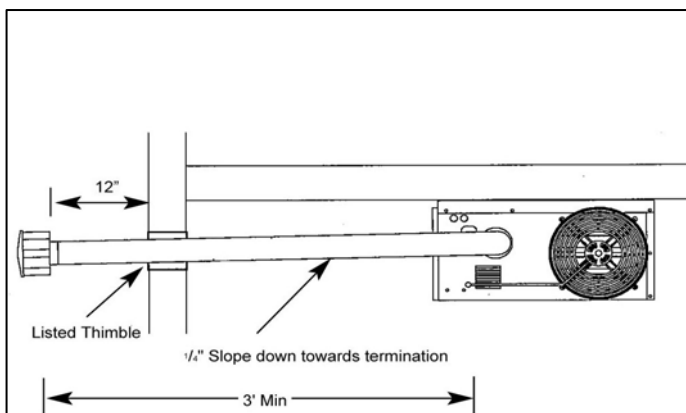


Figure 6 Downward Pitch Condensation Drips Out End



C.) Requirements For Horizontal Venting

1. Horizontally Vented heaters perform as Category III Appliances. This type of venting system follows special venting criteria:

a.) All residential horizontal installed heaters shall be vented with either 4 in. (10.2cm) B-0 double wall vent pipe, 3 in. (7.2cm) AL29-4C stainless steel or and agency certified category III venting system. Certified category III systems can be purchased from your vent pipe distributor . Be sure to follow the manufactures installation instructions for the category III vent. The minimum vent length for this system is 3 ft. (1.0m) and the maximum length is 8 ft. (2.4m). A Gary Steel #1092 or Breident A1092, Type L vent caps may be used.

b.) All commercial and industrial horizontally vented heaters may use either certified category III venting system or single wall galvanized or stainless steel vent. Should unrecognized single wall be used, all joints must be sealed with metallic tape or a silicone suitable for temperatures above 400°F (202°C). Tape must be wrapped at least 2 times around the vent pipe. Insulate single wall vent pipe exposed to cold air or running through unvented areas. 3 in. (7.62cm) vent caps may be used in this application.

- 2.) **Residential:** Minimum vent length is 3 ft. (1.0m) and maximum vent length is 8 ft. (2.4m) of 4 in. (10.2cm) vent pipe. A 3 in. (7.6cm) to 4 in. (10.2cm) bell increaser will be required and 4 in. (10.2cm) vent cap. **Commercial/Industrial:** Minimum vent length is 5 ft. (1.5m) and the maximum vent length is 30 ft. (9.1m). Each 3 in. (7.6cm) elbow is approximately equal to 1 ft. (.34m).

- 3.) Venting system shall terminate a minimum of 3 ft. (.9m) above any forced system located within 10 ft. (3.1m) and a minimum of 4 ft. (1.2m) horizontally from, or 1 ft. (.34m) above any door, window, electric or gas meters, regulators or gravity air inlet into any building. The bottom of the vent terminal shall be located a minimum of 1ft. (.34m) above grade or above the snow line or whichever is the greater. The venting system shall terminate not less than 7ft. (2.1m) above grade adjacent to public walkways.
- 4.) Horizontal vents shall terminate with a listed "L" type vent cap. This cap shall maintain a 12 in. (.3cm) clearance from side of wall. See Figures 4, 5 and 6 on page 5.
- 5.) If condensation should occur, the venting system shall not terminate over public walkways or over areas where condensation or vapor will become a nuisance or hazard or detrimental to operation of regulators, relief openings or other equipment.
- 6.) This vent system must not be used for the purposes of venting other units.
- 7.) On horizontal venting applications, always maintain a 1/4in. (.6cm) per foot (2.54cm) rise away from the unit. Include a drain tee and cleanout near the vent connection. See Figures 4 and 5. Where local authorities have jurisdiction, a 1/4 in. (.6cm) per foot (2.54cm) downward slope away from the heater is acceptable. Figure 6 allows for condensation to drain out the end by the vent cap.
- 8.) Support the venting (flue) system by screwing three (3) sheet metal screws into each pipe connection and then supporting at maximum intervals of 4ft. (1.2m) to prevent sagging (in Canada, support every 3ft. (1.0m) minimum intervals).
- 9.) Figure 4 shows how to vent piping through a combustible wall with either a thimble or type B-0 vent. Check with local authorities having jurisdiction for the proper procedure.

CLEARANCES

Unit heaters for commercial and industrial installation shall have a minimum clearance of 7 ft. (2.1m) from bottom of the heater to floor and residential installation a minimum clearance of 5 ft. (1.5m) from the bottom of the heater to floor.

Table 2
Clearances to Combustible Material

Based on a 160°F (70.4°C)

Top & Bottom:	1 in. (2.54cm)
Vent connector:	4 in. (10.2cm)
Access side:	18 in. (45.7cm)
Non-access side:	1 in. (2.54cm)
Rear:	18 in. (45.7cm)

Make sure that the air intake and discharge air openings are not obstructed.

Accessibility clearances must take precedence over fire protection clearances.

Allow a minimum of 18 in.(45.7cm) clearance at the rear or 6 in. (15.2cm) beyond end of motor of heater. Make sure access side is provided with ample air for both combustion and proper fan operation.

GAS CONNECTION

WARNING: NEVER USE AN OPEN FLAME TO CHECK FOR GAS LEAKS. IF THERE IS A GAS LEAK, EXPLOSION OR INJURY CAN OCCUR. ALWAYS CHECK FOR LEAKS USING A SOAP SOLUTION.

CAUTION

Check inlet supply pressure at the unit and upstream of the gas control. Make sure the inlet supply pressure for natural gas is 6-7in. w.c. (1.2-1.7kPa) and 12-14in. w.c. (3.0-3.5kPa) for LPG.

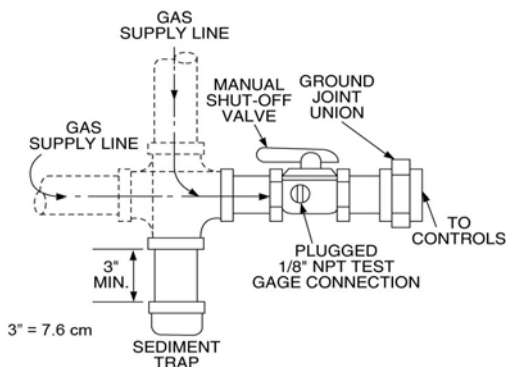
Purging air from gas lines and piping must be done in accordance to the instructions outlined in ANSI Z223.1-latest edition CAN/CGA-B149 codes.

Never exceed 14in. w.c. (3.5kPa) gas pressure to the controls on the unit heater.

The gas line should be as short as possible, be of adequate size to prevent undue pressure drop and *never* be smaller than the connection provided at the heater. Consult the local utility for complete details on special requirements in sizing gas piping. See Table 5 on page 12.

Connect the gas pipe to the heatersft. control, providing a ground joint union to the controls and manifold. Provide a drip leg. See figure 7. An additional manual shutoff valve with a 1/8in. (.3cm) N.P.T. plugged tapping accessible for test gage connection shall be installed external to the unit.

FIGURE 7 PIPING TO CONTROLS



Make sure the piping is pitched upward towards the unit at least 1/4in. (.6cm) per 15ft. (4.6m) of horizontal run.

A regulator is required on the propane tanks. Piping must be gas tight and a non-hardening pipe compound resistant to the actions of LP gas must be used.

Supply piping, including union and external shutoff valve, are not provided.

GAS PRESSURES

Table 3 Pressures

GAS	MAN. PRESS. IN. W.C. (kPa)	SUPPLY PRESS. INCHES W.C. (kPa)	
		MAX.	MIN.
NAT.	3.5 (.87)	14.0 (3.5)	6.0 (1.2)
LPG	10.0 (2.5)	14.0 (3.5)	11.0 (2.7)

The manifold pressure may be measured by removing the pipe plug on the downstream side of the gas control and connecting a water manometer.

Only a small variation in gas input may be made by adjusting the regulator. In no case should the final manifold pressure vary by more than 0.3" w.c. (.1kPa) from the above specified pressures shown in Table 3. Where the supplied gas pressure has a greater specific gravity use the multiplying factors shown in Table 4.

Table 4 SPECIFIC GRAVITY CONVERSION FACTORS

Multiply factors to be used with Table 4 when the specific gravity of gas is other than 0.60.

Natural Gas		LP (Propane) Gas	
Specific Gravity	Factor	Specific Gravity	Factor
0.55	1.04	1.50	0.633
0.60	1.00	1.53	0.626
0.65	0.962	1.60	0.612

Follow these two (2) methods for input adjustment:

Method A - Meter Timing

To check a heaters input rate, observe the gas

meter, making sure all other appliances are turned off.

The test hand on the meter should be timed for at least one (1) revolution. Note the number of seconds for one (1) revolution. Use this formula to obtain the BTU/Hr input rate:

$$\text{BTU/Hr} = (\text{Ft}^3/\text{rev.} \div \text{No. sec./rev.}) \times 3600 \times \text{Heating Value}$$

Your local utility or gas supplier can give you the heating value needed. However, the following representative values may be used:

GAS	BTU/FT³
Natural	1000 - 1150
LPG (Propane)	2500

Also, you may use Table 5 (meter-timings) based on different size meters.

Table 5 Meter-timing Gas

(Timing required for one revolution is charted for various size meter dials and various rate of gas input in cu. ft. per hour.

To convert to Btuh, multiply by the heating value of the gas used.)

Time for 1 Revolution (Seconds)	Input, Cu. Ft. per Hour, when meter dial size is:			
	1/2 F³	1 Ft³	2 F³	5 Ft³
10	180	360	720	1800
12	150	300	600	1500
14	129	257	514	1286
16	112	225	450	1125
18	100	200	400	1000
20	90	180	360	900
22	82	164	327	818
24	75	150	300	750
26	69	138	277	692
28	64	129	257	643
30	60	120	240	600
35	51	103	206	514
40	45	90	180	450
45	40	80	160	400
50	36	72	144	360
55	33	65	131	327
60	30	60	120	300
70	26	51	103	257
80	22	45	90	225
90	20	40	80	200
100	18	36	72	180
120	15	30	60	150

If the regulator needs adjustment, the regulator adjusting screw may be turned clockwise to increase the pressure or counterclockwise to decrease the manifold pressure by more than or less than 0.3" w.c. (8.7kPa).

Method B - Pressure Method

This method determines the input rate by measuring the gas pressure in the manifold in inches water column.

Proceed as follows:

- 1.) Find the correct manifold pressure shown in Table 6 on page 13.
- 2.) Locate the combination control inside the heater and then push in on the ON/OFF lever so that it snaps to the closed position.
- 3.) Remove the 1/8in. (.3cm) plugged tapping from outlet of the control and then attached either a water manometer or "U" shape tube which is at least 12 in. (.3cm) high.
- 4.) Put heater into operation per the lighting instructions and set the thermostat up so that the heater will continue to operate.
- 5.) If the manometer or "U" shape tube pressure indication is less than 1/2" w.c. (1.3cm) higher or lower than shown in Table 6, adjust the regulator as described in **Method A Meter Timing**. If the manometer or "U" shape tube pressure indication is more than 1/2" w.c (1.3cm) higher or lower than shown in Table 6, check the inlet gas pressure at heater.

Application	Gas Inlet Pressures
Natural Gas	6 - 7" w.c. (1.5-1.7 kPa)
Propane Gas	12 - 14" w.c. (3-3.5 kPa)

- 6.) After adjustment has been completed, make sure the gas flow is shutoff at the heater by pressing in on the lever so that it snaps to the OFF position. Replace the 1/8" (.3cm) plug taps and turn gas on.

7. Restart heater by following the light instructions.
Set thermostat to the desired temperature setting.

Tabel 6 Manifold Pressure & Gas Consumption

	BTU/Cu. ft.	Spec. Gravity	Manifold Pressure in. W.C / kPa
Natural Gas	1050	0.6	3.5 / 0.87
LP Propane	2500	1.53	10.0 / 2.5

Model		Natural Gas	LP Propane	Orifice Qty.
30	CFH	28.6	12.0	2
	Gal/Hr. LPG		0.33	
	Sec/Cu ft.	12.6	300	
	Orifice DMS	49	56	
45	CFH	42.9	18.0	3
	Gal/Hr. LPG		0.50	
	Sec/Cu ft.	12.6	200	
	Orifice DMS	49	56	
60	CFH	57.1	24.0	4
	Gal/Hr. LPG		0.66	
	Sec/Cu ft.	63	150	
	Orifice DMS	49	56	
75	CFH	71.4	30.0	5
	Gal/Hr. LPG		0.83	
	Sec/Cu ft.	50	180	
	Orifice DMS	49	56	

Tabel 7 Gas Pipe Capacities*

Length of Pipe ft. / (m)	Diameter of Pipe - inches / (cm)			
	1/2 / (1.3)	3/4 / (1.9)	1 / (2.54)	1-1/4 / (3.2)
15 (4.6)	76	218	440	750
30 (9.1)	73	152	285	590
45 (15.7)	44	124	260	435
60 (18.3)	50	105	190	400
75 (22.9)		97	200	345
90 (27)		88	160	320
105 (32)		80	168	285
120 (36)			158	270
150 (46)			128	242
180 (55)			120	225
210 (64)				205
240 (73)				190
270 (82)				178
300 (91)				170
450 (137)				140
600 (183)				119

* In Cu. Ft. per Hour with Pressure Drop of 0.3 in. W.C.
(.1kPa) with Specific Gravity of 0.60)

Electrical Connections

CAUTION

Power supply must be disconnected before making any wiring connections to prevent electrical shock and damage to equipment. Units must be wired in strict accordance with the wiring diagram furnished with the heater.

A fused circuit or circuit breaker must be used to protect the heater at all times.

This appliance must be electrically grounded in accordance with local codes, with the latest edition of the National Electric Code, ANSI/NFPA 70, and/or the CSA C22.1 Canadian Electrical Code, if an external electrical source is utilized.

Use wiring with a temperature rating of 105 °C; run the 115 volt, 60 hertz electric power supply through either a 15 amp fused circuit or 15 amp circuit breaker to the junction box of the heater as shown in the wiring diagram.

See Figure 8 on Page 14.

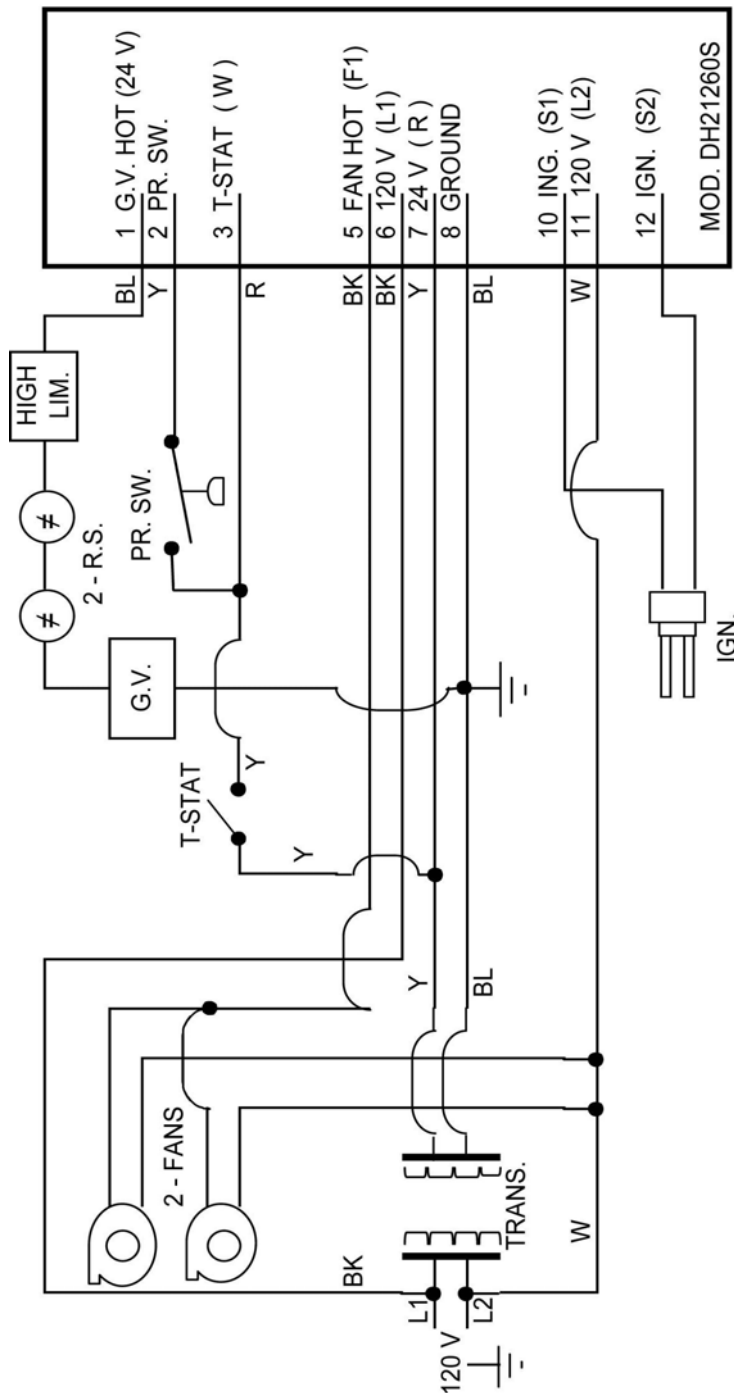
If any of the original wire supplied with the heater must be replaced, replace with wiring material having a temperature rating of at least 105°C.

Install the thermostat according to directions furnished. The thermostat should be located on an inside wall about 5 ft. (1.5 m) above floor level.

PLEASE NOTE

The unit has a grounded plug which **MUST** be connected to an outlet and breaker which are grounded. Also, the outlet must have the proper polarity. If there is a poor ground or the polarity is reversed, the burners will light for only a few seconds and go out. To correct, simply shut power off at the breaker and verify solid ground and/or reverse the HOT (Black Wire) and Neutral (White Wire) on the terminals of the the outlet. Turn power on at the breaker and cycle unit to verify proper operation.

FIGURE 8 DGH WIRING DIAGRAM



PROPER POLARITY IS REQUIRED

BEFORE OPERATING UNIT HEATER

Follow these on-site pre-operational procedures before putting unit heater into operation:

1. Turn off power supply.
2. Check all clearances.
3. Make sure fan is not contacting casing when blade is spun by hand.
4. Check to make sure deflector blades are at a 30° minimum angle from the horizontal.
5. Make sure all electrical connections are secure.
6. Check for gas leaks.

LIGHTING / OPERATING INSTRUCTIONS

FOR YOUR SAFETY, READ BEFORE OPERATING

WARNING

If you do not follow these instructions exactly a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. **DO NOT TRY TO LIGHT THE BURNER BY HAND.**

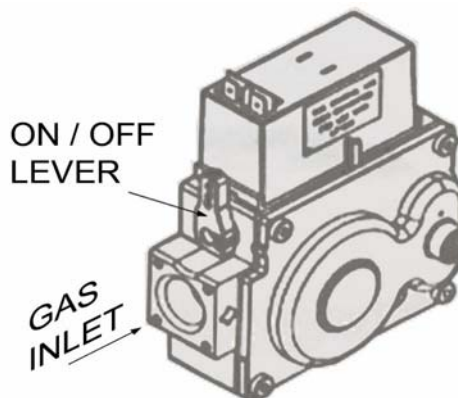
B. BEFORE OPERATING, smell around the area where the appliance is installed for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- * Do not try to light any appliance.
- * Do not touch any electric switch; do not use any phone in your building.
- * Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
- * If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to move the gas control switch. Never use tools. If the switch will not move by hand, don't try to repair it, call a qualified technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.



OPERATING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Set thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove the access panel.
6. Push in "ON" control lever. Lever will spring to the "OFF" position.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP.! Follow "B" above. If you don't smell gas, go to the next step.
8. Move gas lever counter clockwise to the "ON" position.
9. Replace Control access panel.
10. Turn on all electric power to the appliance.
11. Set Thermostat to the desired setting.
12. If the appliance will not operate, follow the instructions "**To Turn Off Gas to Appliance**" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

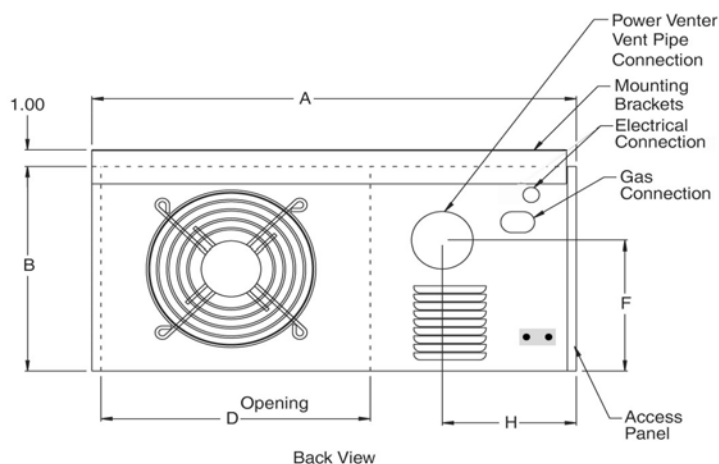
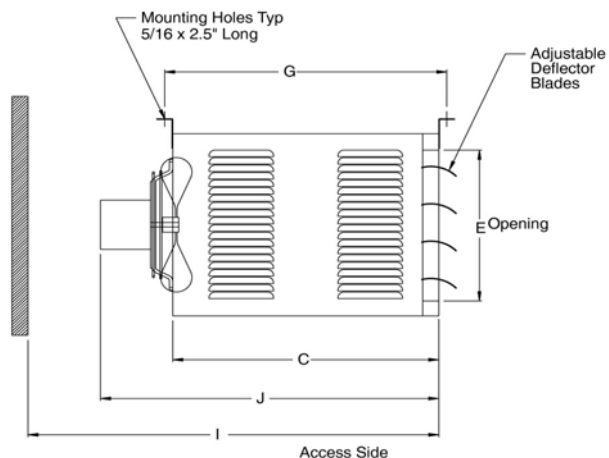
1. Set thermostat to lowest setting.
2. Turn manual shut-off valve located outside of the unit to the closed position.
3. Turn off all electric power to the appliance if service is to be performed.
4. Remove access panel.
5. Push in on control lever. Lever will spring to the "OFF" position.
6. Replace the access panel.

OPERATING SEQUENCE

Upon call from thermostat, power is supplied to the exhaust and circulating motors. As the exhaust motor speeds up, the pressure switch circuit closes allowing the hot surface ignitor to become energized. Following the ignition heat-up period the main gas valve will open to allow gas flow to the burners. Once the flame has been detected, the ignitor is de-energized. When the thermostat is satisfied and the demand for heat ends, the gas valve is de-energized immediately stopping the flow of gas to the burners until the next call for heat. The circulating and exhaust blowers continue to operate for another 60 seconds before they shut off. If a flame is not sensed for any reason, there will be three (3) tries for ignition and the ignition module will go into lockout shutting down the entire system at which time **either the thermostat will need to be reset manually or the power supply must be shut-off for 5 seconds.**

TECHNICAL / DIMENSIONS

FOR DGH (30, 45, 60, 75)



TECHNICAL

MODELS	30	45	60	75
BTU Input	30,000	45,000	60,000	75,000
BTU Output	24,000	36,000	48,000	60,000
Inlet CFM	505	720	990	1160
Outlet CFM	523	749	653	769
Temp. Rise (F° / C°)	44 / 6.6	46 / 7.7	45 / 7.2	48 / 8.8
Max. Mounting Height (ft. / m)	10 / 3	10 / 3	12 / 3.6	12 / 3.6
Heat Throw (ft / m)	25 / 7.6	27 / 8.2	36 / 10.9	38 / 11.6
HP	1/15	1/15	1/12	1/12
RPM	1550	1550	1625	1625
Type	S.P.	S.P.	P.S.C.	P.S.C.
Amp	1.5	2.4	1.2	1.2
Total Amps	2.8	3.7	2.5	2.5
Vent Dia (in. / cm)	3 / 7.6	3 / 7.6	3 / 7.6	3 / 7.6

DIMENSIONS (inches / cm)

MODELS	30	45	60	75
A	26.8 / 68.1	26.8 / 68.1	26.8 / 68.1	26.8 / 68.1
B	12.2 / 31	12.2 / 31	18 / 45.7	18 / 45.7
C	16.5 / 41.9	16.5 / 41.9	16.5 / 41.9	16.5 / 41.9
D	14.9 / 37.8	14.9 / 37.8	14.9 / 37.8	14.9 / 37.8
E	10.1 / 25.7	10.1 / 25.7	15.9 / 40.4	15.9 / 40.4
F	7.7 / 19.6	7.7 / 19.6	13.7 / 34.8	13.7 / 34.8
G	17.5 / 44.5	17.5 / 44.5	17.5 / 44.5	17.5 / 44.5
H	7 / 17.8	7 / 17.8	7 / 17.8	7 / 17.8
Gas Input	.5 / 1.3	.5 / 1.3	.5 / 1.3	.5 / 1.3
I	28 / 71.1	28 / 71.1	31 / 78.7	31 / 78.7
J	22 / 55.9	22 / 55.9	25 / 63.5	25 / 63.5
Fan Dia.	10 / 25.4	10 / 25.4	14 / 35.6	14 / 35.6
Wt. (lb / kg)	55 / 25	60 / 27	80 / 36	85 / 38

MAINTENANCE & SERVICE

SERVICING OR REPAIRING THIS EQUIPMENT MUST BE DONE BY A QUALIFIED TECHNICIAN.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and replace any gas control which has been under water.

Should overheating occur, or the gas valve supply fail to shut-off, shut-off the manual gas valve to the appliance before shutting off the electrical supply.

Prior to any maintenance or cleaning to the unit, make sure that the gas and electrical supply is turned off.

THE UNIT AND VENTING SYSTEM MUST BE INSPECTED AT LEAST ONCE PER YEAR BEFORE THE HEATING SEASON BEGINS.

To clean the outside of the appliance, use a soft cloth and soap solution. *Never use an abrasive to clean any surfaces.*

MAINTENANCE

1. Remove the access panel.
2. Close manual gas valve and disconnect the union on the gas line.
3. Disconnect wires from the gas valve along the with the ignition wires from S1 and S2 on the module.
4. Remove the screws that attach the burner tray assembly from the vestibule panel. The entire assembly comes out as one piece..
5. Carefully clean the burners with a small wire brush and vacuum.
6. While assembly is out, check the orifices to make there is no blockage.
7. Check each tube type heat exchanger for dirt or cracking. If dirty, clean with a wire brush and vacuum. If any cracks are seen, replace the heat exchanger assembly.
8. Re-assemble burner tray assembly and gas piping. Make sure piping is tight.
9. Check all wiring for loose connections or cracks in the insulation. Also check to make sure the rubber tube connected to the pressure switch has not dried-out and cracked. Replace as necessary.
10. Re-connect wiring to the gas valve and to the terminals S1 and S2 on the module.
11. Check circulating blower assembly to make sure that there is no damage to the fan blade and that the blade is secured to the motor shaft.
12. Power exhaust assembly - the motor used is permanently lubricated. If this assembly needs cleaning, blow out the cooling air passages of the motor with compressed air.

13. Turn gas and electricity back on and set the thermostat high enough to cycle the unit to go through a complete cycle to ensure proper operation and that there is no gas leakage.
14. Replace access panel and set the thermostat at the desired setting.
15. Replace any worn or broken components and wiring as necessary to ensure trouble-free operation.
16. The heater and its gas valve must be disconnected from the gas supply piping, and the supply line must be plugged prior to conducting any pressure/leak testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).

Close the manual shut-off valve to the unit during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (3.5 kPa).

SAFETY DEVICES

1) Limit Control

This control is located in the access compartment and the element is located in the air stream by the tube heat exchanger. This control will shut off the gas to the burners should overheating result. The limit control will function if the wall thermostat or some other component(s) malfunction. Once this limit cools, it will reset automatically and allow the heater to re-try for ignition. If the same problem should occur, immediately shut the gas supply and electricity off. Call a qualified technician immediately for service.

2) Rollout Switches

The switches are located on the bottom burner panel. If for some reason flames rollout during an ignition cycle and touch these switches, the gas flow will be shut off. When cooled, the switches must be manually reset by pushing in on the push button located on the top of each switch.

SAFETY DEVICES (Continued)

3) Pressure Switch

This is a normally open type switch which monitors the venting system. When the inducer motor speeds up to produce enough vacuum in the venting system, the contacts in the pressure switch close to complete the circuit to the ignition system. If for some reason the inducer motor fails to operate or should the venting system becomes blocked, the pressure switch contacts open and the unit will not operate.

If the pressure switch contacts do not close, check the following:

1. Verify that venting system *does not* elbow within 12" of the 3" dia. vent connect at rear of the appliance.
2. Check venting system for blockage. Remove the obstruction(s).
3. Check to make sure the tube between the power exhaust and the pressure switch is secured and has not deteriorated. If bad, replace.
4. See if there is air flow at the vent terminal. Replace pressure switch if there is air flow. Replace the power exhaust if there is no air flow.

4) Hot Surface Ignitor

the ignitor is made from a ceramic material which must glow red hot until it reaches a required temperature to ignite the gas flowing through the burners. If the igniter does not glow red hot, check the resistance. If less than 100 Ω (ohms), replace the igniter.

To replace, disconnect the leads S1 and S2 from the module and remove the two (2) screws holding the igniter to the burner box cover. **Be very careful when installing a new igniter as they can break easily.** Re-connect leads to S1 and S2 on the module

LED DIAGNOSTIC CAPABILITY

The red LED on the ignition module indicates the condition of the control system. The following codes indicate what type of failure is occurring and are also shown on the module.

ERROR MODE	LED INDICATION
Normal Operation	Steady ON
No Power/Internal Fault	Steady OFF
Flame Sensed out of Sequence	1 Flash
Ignition Trail Lockout	2 Flash
Pressure Switch	3 Flash

TROUBLESHOOTING INFORMATION

There are a few basic troubleshooting items that you may perform if, for some reason, the heater does not operate. All other troubleshooting **MUST BE DONE BY A QUALIFIED TECHNICIAN.**

A. If the heater does not light:

1. Make sure the thermostat is set above the room temperature.
2. Make sure there is power to the heater.
3. Make sure the main gas supply is on at the manual shut-off valve.
4. If none of the above solve the problem, contact a qualified technician.

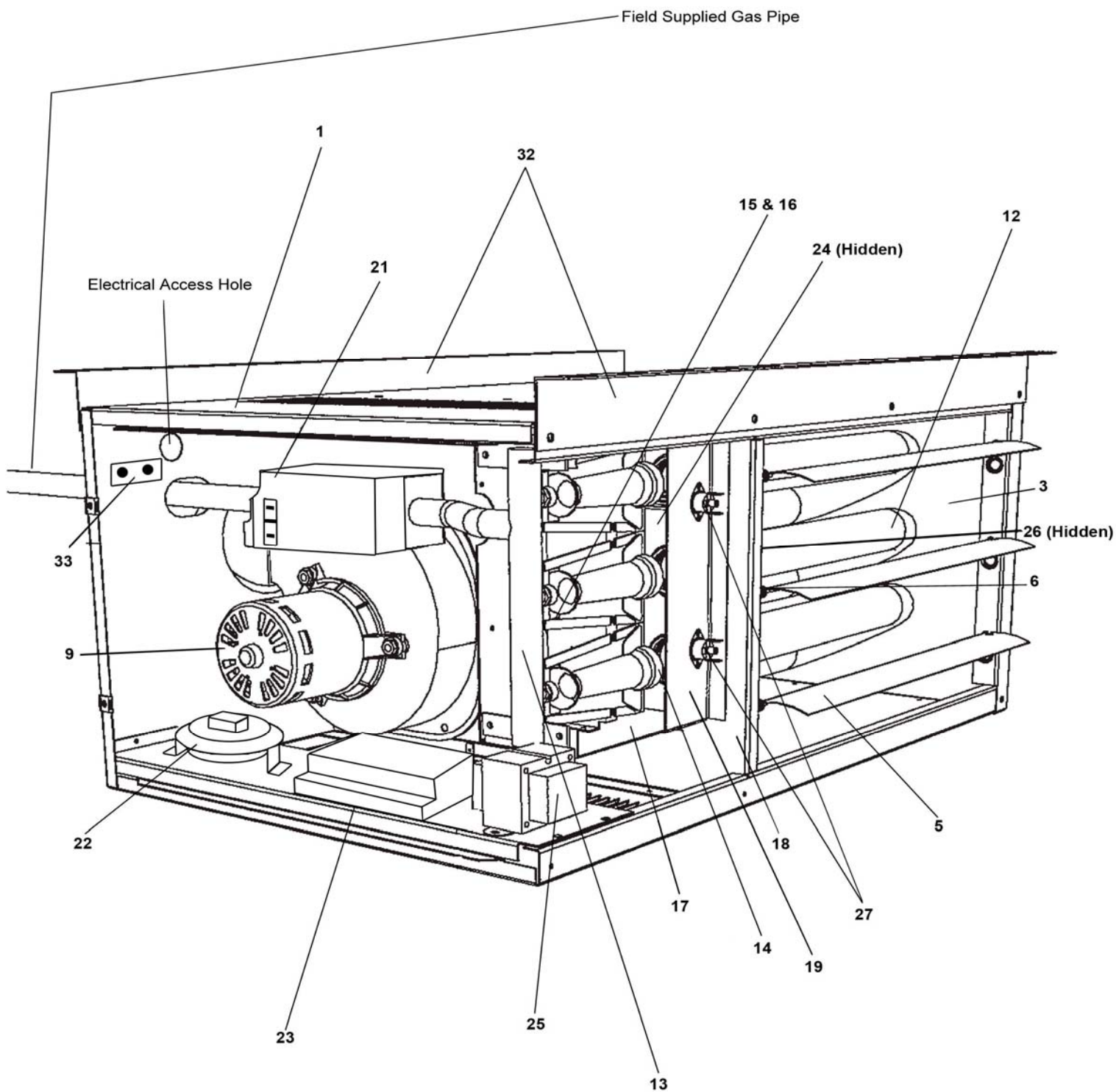
B. Air feels cold coming out of the heater.

1. Make sure burner is lit.
2. If the room was cold to begin with, it will take a while for the air coming out of the heater to feel warm.
3. If the air coming out of the heater continues to feel cold after 5 minutes and the room is not warming up, contact a qualified technician.

SERVICING AND REPAIR

If a qualified service person cannot solve the problem, consult your local gas company or the manufacturer.

When servicing, repairing or replacing parts on the unit, always give the complete Model and Serial numbers from the unit rating plate located inside the unit on the panel in front of the burners.



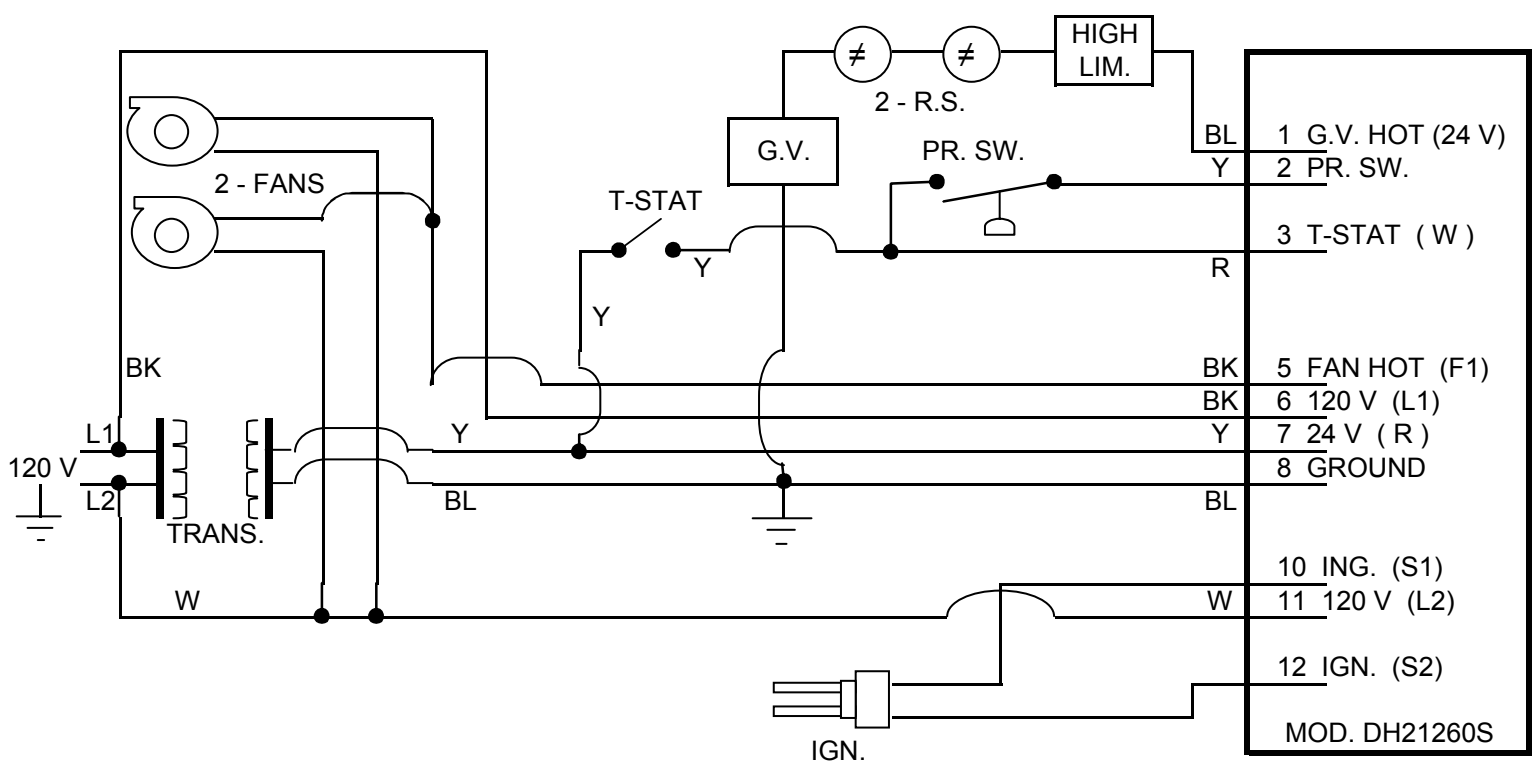
WINCHESTER Garage Heater Parts Listing

Ref #	Description	DGH 30	DGH 45	DGH 60	DGH 75
1	Casing Wrapper	GH-1001	GH-1001	GH-1025	GH-1025
2	Cover Panel*	GH-1002	GH-1002	GH-1026	GH-1026
3	Front Panel	GH-1003	GH-1003	GH-1027	GH-1027
4	Side Panel*	GH-1004	GH-1004	GH-1028	GH-1028
5	Louvers	GH-1005 (3)	GH-1005 (3)	GH-1005 (5)	GH-1005 (5)
6	Springs, for Louvers	GH-1005	GH-1005	GH-1005	GH-1005
7	Collector box*	GH-1008-1	GH-1008-2	GH-1030-1	GH-1030-2
8	Collector box Gasket*	GH-1007	GH-1007	GH-1029	GH-1029
9	Ventor Assembly	GH-1040	GH-1040	GH-1040	GH-1040
10	Ventor Gasket*	GH-1009	GH-1009	GH-1009	GH-1009
11	Exhaust Outlet*	GH-1020	GH-1020	GH-1020	GH-1020
12	Heat Exchanger Assbly.	GH-1018-1	GH-1018-2	GH-1018-3	GH-1018-4
13	Manifold	GH-1010-1	GH-1010-2	GH-1010-3	GH-1010-4
14	Burner	GH-1044 (2)	GH-1044 (3)	GH-1044 (4)	GH-1044 (5)
15	Orifice (Natural)	GH-1011 (2)	GH-1011 (3)	GH-1011 (4)	GH-1011 (5)
16	Orifice (LP)	GH-1011-1 (2)	GH-1011-1 (3)	GH-1011-1 (4)	GH-1011-1 (5)
17	Burner Box Top	GH-1013-1	GH-1013-2	GH-1013-3	GH-1013-4
18	Burner Bracket	GH-1014-1	GH-1014-2	GH-1014-3	GH-1014-4
19	Burner Box Bottom	GH-1015-1	GH-1015-2	GH-1015-3	GH-1015-4
20	Control Panel	GH-1016	GH-1016	GH-1016	GH-1016
21	Gas Valve	GH-1032	GH-1032	GH-1032	GH-1032
22	Pressure Switch	GH-1034	GH-1034	GH-1034	GH-1034
23	Ignition Module	GH-1035	GH-1035	GH-1035	GH-1035
24	Hot Surface Ignitor	GH-1039	GH-1039	GH-1039	GH-1039
25	Transformer	GH-1033	GH-1033	GH-1033	GH-1033
26	Limit Control	GH-1037	GH-1037	GH-1037	GH-1037
27	Rollout Switch**	GH-1038	GH-1038	GH-1038	GH-1038
28	Pressure Switch Hose*	GH-1041	GH-1041	GH-1041	GH-1041
29	Fan Blade*	GH-1042-1	GH-1042-1	GH-1042-2	GH-1042-2
30	Fan Guard*	GH-1043-1	GH-1043-1	GH-1043-2	GH-1043-2
31	Fan Motor*	GH-1036-(1/15)	GH-1036-(1/15)	GH-1036-(1/12)	GH-1036-(1/12)
32	Mounting Bracket	GH-1023	GH-1023	GH-1023	GH-1023
33	Thermostat Terminal	H-10021	H-10021	H-10021	H-10021
34	Power Cord*	H-3257	H-3257	H-3257	H-3257
35	Terminal Block*	GH-1059	GH-1059	GH-1059	GH-1059
36	LP Conversion Kit (option	LPG-75GH	LPG-75GH	LPG-75GH	LPG-75GH

* NOT SHOWN

** MODELS USE TWO

Unit Wiring Diagram



1-Year Part Warranty / 10-Year Heat Exchanger Warranty

ADAMS LIMITED WARRANTY

Adams, manufacturer of WINCHESTER brand garage heaters, referred to as Adams herein, warrants to the original owner-user that this Unit Heater will be free from defects in material or workmanship. This warranty is limited to twelve (12) months from the date of original installation, whether or not the actual use begins on that date, or eighteen (18) months from the date of shipment by Adams, whichever shall expire first.

The heat exchanger shall have an extended nine (9) year non-prorated warranty in addition to the standard warranty.

Adams' obligation under this warranty is limited to repair or replacement at Adams' manufacturing facility in Cleveland, OH, of any part or parts of this product identified by model and serial numbers which shall be returned with transportation charges prepaid and which Adams' examination shall disclose to its satisfaction to be defective. Adams' parts or products shall not be returned to the factory without an attached Return Goods Authorization. Repaired products or replacement parts shall be shipped by Adams F.O.B. Cleveland, OH.

EXCLUSIONS

1. This warranty does not cover labor or other costs incurred in repairing, removing, installing, servicing, or handling of parts or complete products.
2. This warranty will not apply if the input to the product exceeds the rated input as indicated on the data plate by more than 5%, or if the product in the judgment of the Adams has been subjected to misuse, negligence, accident, corrosive atmospheres, excessive thermal shock, physical damage, impact, abrasion, unauthorized alterations, or operation contrary to Adams' printed instructions, or if the serial number has been altered, defaced, or removed.
3. Adams shall not be liable for any default or delay in performance of its warranty obligations hereunder caused by any circumstances beyond its control, including but not limited to government restrictions or restraints, strikes, fires, floods, or reduced supplies of raw materials, energy, or parts.
4. Adams will not be liable for any loss, damage, cost of repair, or incidental or consequential damages of any kind in connection with the sale, use, or repair of any Adams products. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED AND IMPLIED, AND ADAMS DISCLAIMS ALL OTHER EXPRESSED WARRANTIES AND ALL IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE. No person is authorized to assume for Adams any other warranty, obligation, or liability.

Unit Model Number: _____

Serial Number: _____

(Homeowner to log model/serial numbers found on the unit rating plate located inside heater on the panel in front of burners for easy reference.)